Cachya – Head Tracking Software

User’s Manual (revision 2.1.001)

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1. Forward

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2. How to use the Manual

This document covers the usage of both Trial version and Full version software. Features that are limited or not available in Trial version are mentioned in each related section of the document.

We strongly recommend reading this manual before using Cachya Head Tracking Software. For those who want to quickly jump in and start experimenting with the software, **Getting Started** is a good starting point. If you encounter problems, please consult other sections of this document.

3. Introduction

Cachya is real time, 6DOF (Degrees Of Freedom) head tracking software. It analyzes an input video stream, looks for a unique SIGN that can be put on user's hat, and determines head position and movement. There is no requirement for costly or specialized hardware. A regular webcam will provide excellent results.

Cachya not only detects positions, with the help of its pre-determined mathematical model, it can also predict head movement according to historical data. This results in continuous, smooth and accurate outputs.

4. What's new in version 2.1

- Microsoft Vista support.
- Microsoft FSX native support with easy 6DOF configuration.
- Client-Server architecture with minimum CPU usage on the client.
- Vista compatible device driver.
- Improved motion blur tolerance.
- Complete User's Manual.

5. System Requirements

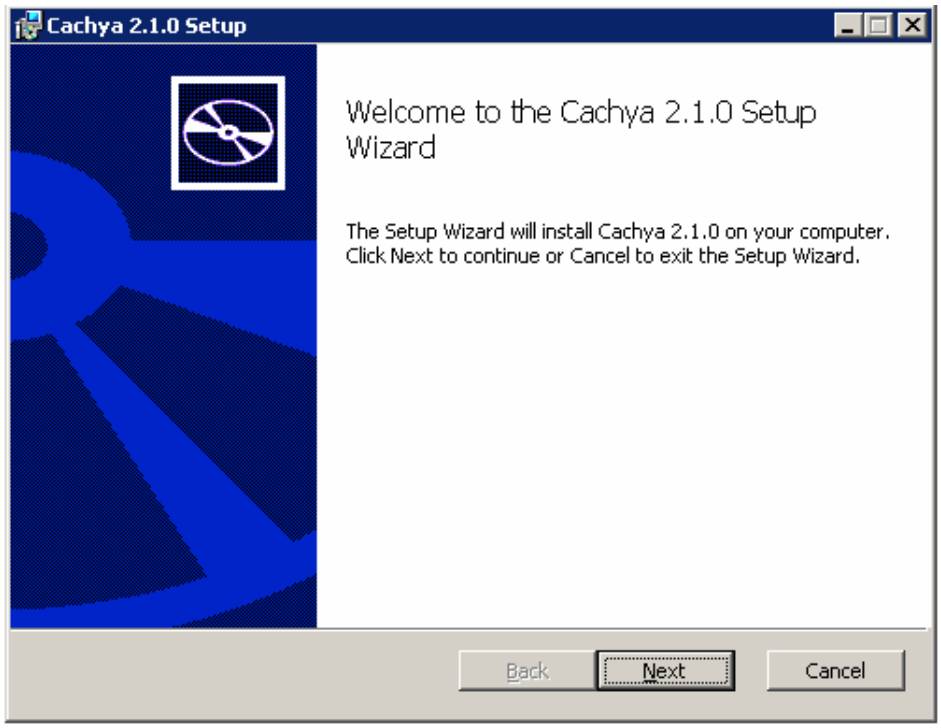
- Microsoft Windows 2000, Windows XP or Windows Vista.
- Microsoft DirectX 8.0 or higher.
- 1 GHz Processor for server, 300MHz Processor for client.
- 10 megabytes free hard disk space.
- 256 megabytes memory.
- Video capture device (Typically an USB webcam).

6. Getting Started

6.1. Software Installation

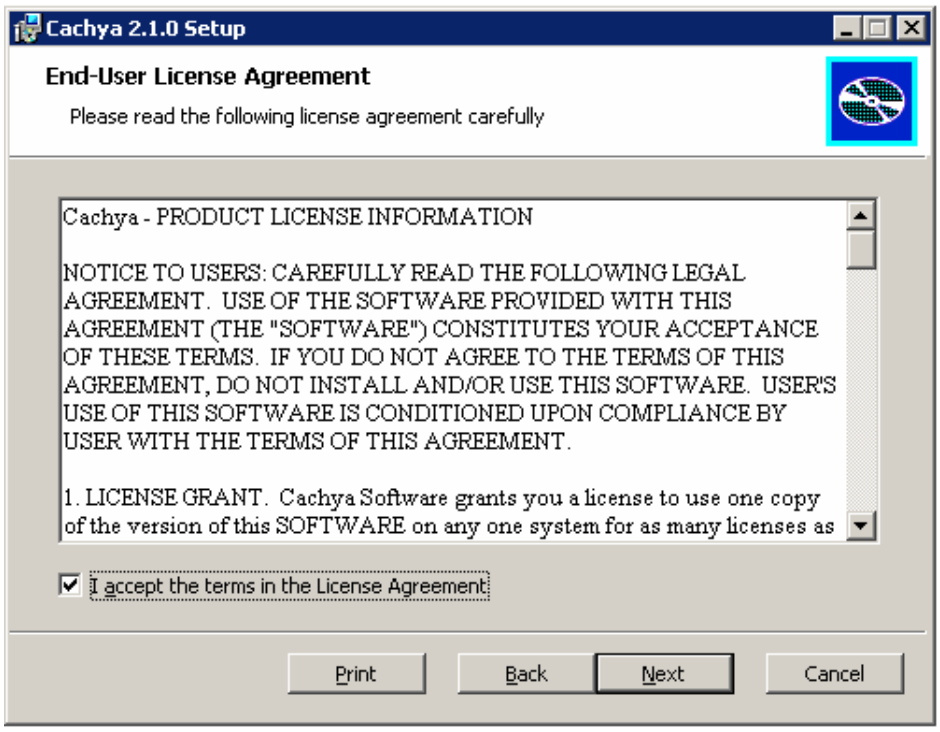
Note: You must have system administrator privilege to install this software. Installation may require PC reboot.

- Download installation package from Cachya Download Page.
- Start installation by double-clicking the package file.
- Click “Next” on page 1.

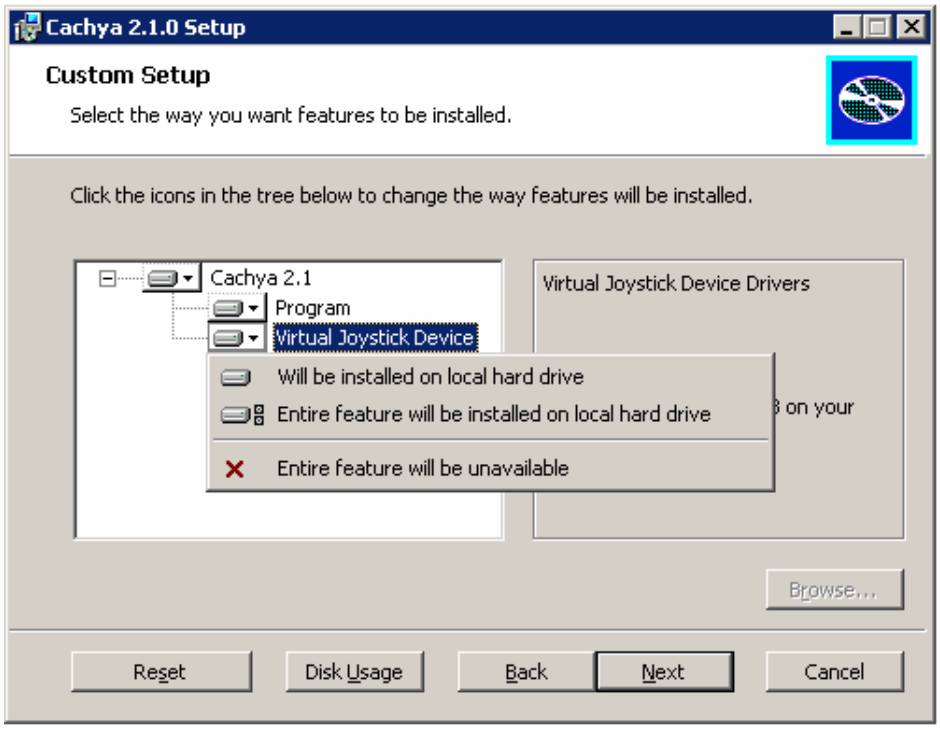

Cachya 2.1.0 Setup
Welcome to the Cachya 2.1.0 Setup Wizard
The Setup Wizard will install Cachya 2.1.0 on your computer. Click Next to continue or Cancel to exit the Setup Wizard.
Back
Next
Cancel

Installation Wizard Page 1 – click “Next” to continue

- Accept the terms in License Agreement then click “Next”.

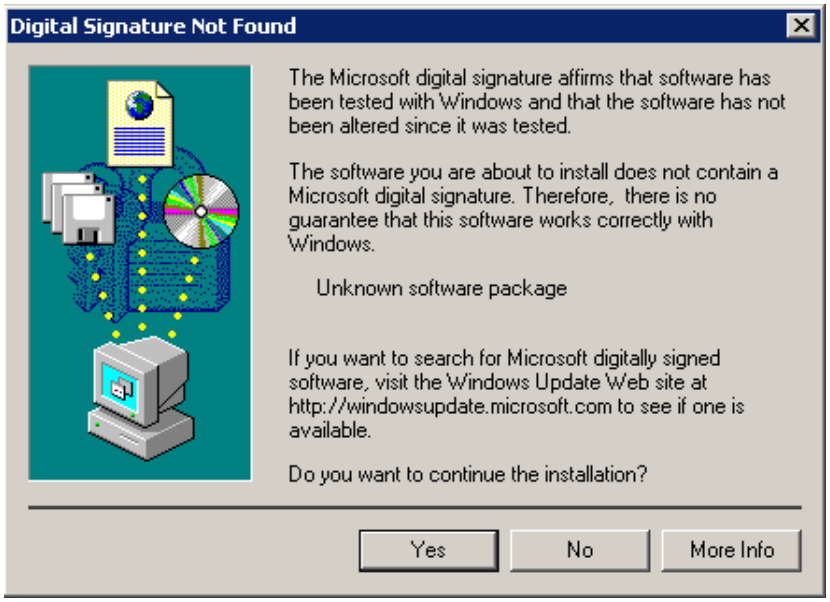

Cachya 2.1.0 Setup
End-User License Agreement
Please read the following license agreement carefully
Cachya - PRODUCT LICENSE INFORMATION
NOTICE TO USERS: CAREFULLY READ THE FOLLOWING LEGAL AGREEMENT. USE OF THE SOFTWARE PROVIDED WITH THIS AGREEMENT (THE "SOFTWARE") CONSTITUTES YOUR ACCEPTANCE OF THESE TERMS. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT INSTALL AND/OR USE THIS SOFTWARE. USER'S USE OF THIS SOFTWARE IS CONDITIONED UPON COMPLIANCE BY USER WITH THE TERMS OF THIS AGREEMENT.
1. LICENSE GRANT. Cachya Software grants you a license to use one copy of the version of this SOFTWARE on any one system for as many licenses as
I accept the terms in the License Agreement
Print
Back
Next
Cancel
Installation Wizard Page 2 – click “Next” to continue

- Choose Software features that you want to install on page 3. If you intend to use Cachya for FSX alone, you may remove “Virtual Joystick Device” from feature list by selecting “Entire feature will be unavailable”; or you can install this feature but disable virtual device after installation is finished.



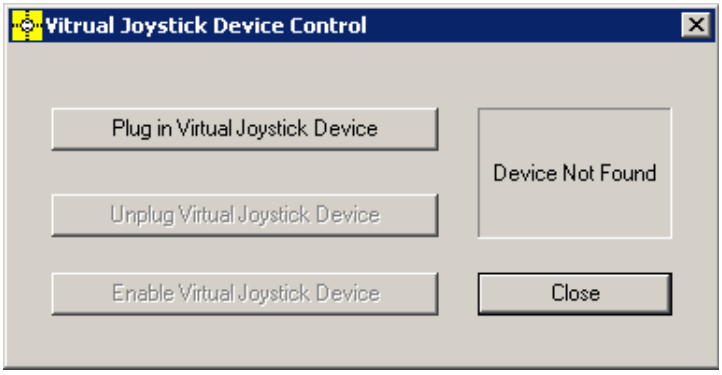
Installation Wizard Page 3 – select features then click “Next”

- Click install on the next page to start installation.
- Windows may display “unsigned driver warning message”, click either “OK” or “Continue anyway” to continue.


Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
Unknown software package
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

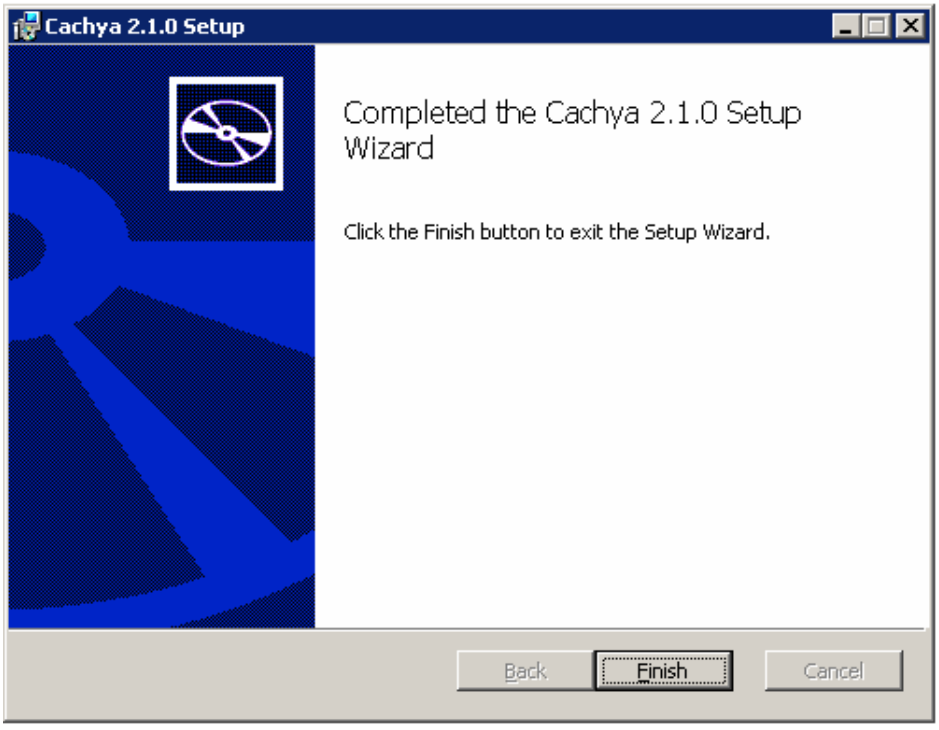
Windows 2000 Warning Message – click “Yes” to continue

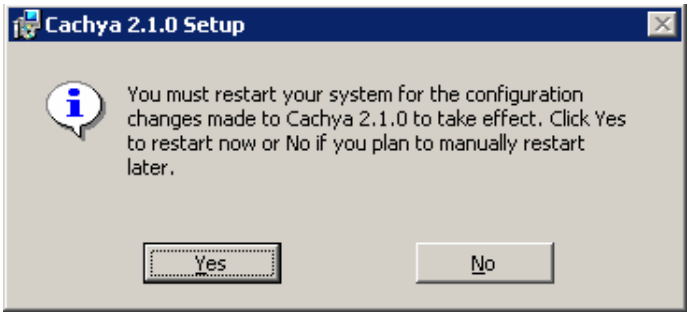
- When prompted, click “Plug in Virtual Joystick Device” button, and then “Close” button.



Plug in device message box

- Click “Finish” on the last page and reboot computer if you are prompted to do so.




Cachya 2.1.0 Setup
You must restart your system for the configuration changes made to Cachya 2.1.0 to take effect. Click Yes to restart now or No if you plan to manually restart later.
Yes
No
Reboot PC Message Box – click “Yes” to reboot PC

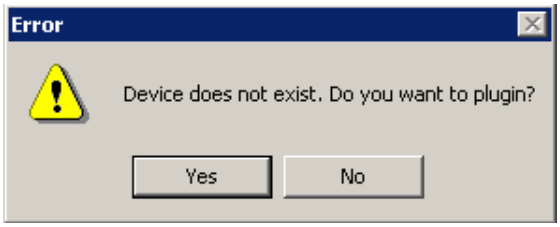
6.2. First Launch

6.2.1. Check video camera

- Make sure to have your video camera connected properly.
- Close other programs that require video camera.
- Place your camera directly in front of your face. Usually, the best place for the camera is on top of your monitor.

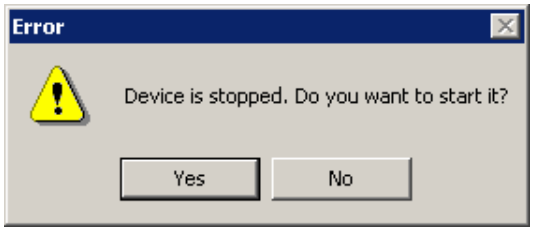
6.2.2. Launch the Cachya Software.

- If this is the first time you use the Cachya software, it may ask you to plug in virtual joystick device (if you did not plug in device during installation). Click “Yes” to continue; otherwise, Virtual Joystick Device will not be available.



Device Not Found Message Box – Click “Yes” to plug in

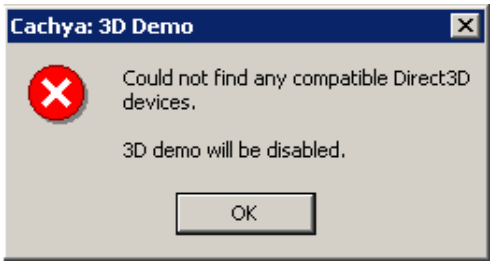
- Depends on your OS version, software may ask you to start Virtual Joystick Device. Click “Yes” to start it. This may require PC reboot.



Device Not Started Message Box – Click “Yes” to start it

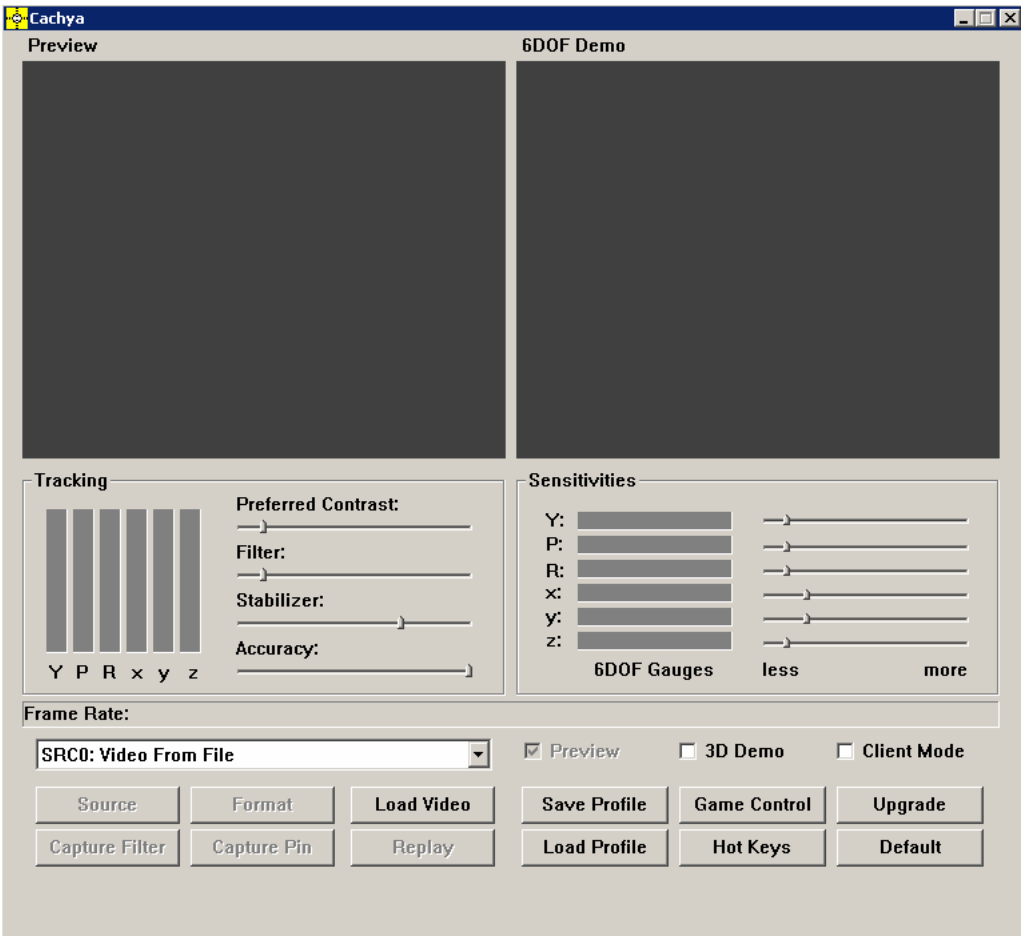
- The trial version pops up a message box. Click OK to continue.

- 3D demo requires Direct-3D hardware support. An error message will pop up if Cachya cannot find any compatible hardware. Click “OK” to proceed, if you wish. 3D demo will not be available in that case.



Direct-3D compatible hardware not found – Click OK to ignore

6.3. Familiarize yourself with the Cachya front panel



Cachya Front Panel

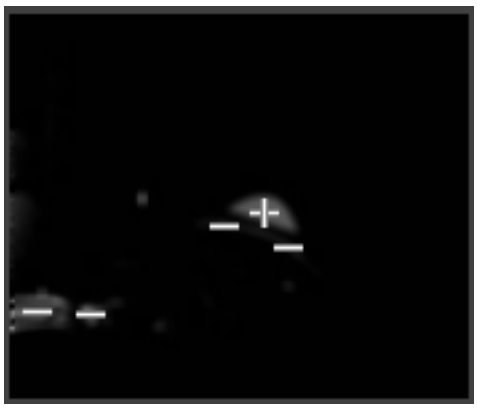
6.3.1. Use demo video

- Press “Load Video” button to load “sample_176_144.avi”. This is a recorded video sample to demonstrate software features. Video should commence play once loaded. It repeats once it reaches its end. You can use “Replay” button to roll back video to the beginning.

- Note the “+” sign in the play back window. It follows the tracking target, a head sign mounted on the user’s hat. The “+” sign indicates that the target is recognized and under tracking. It does not appear immediately as video starts, but after a few seconds’ delay.

- Other than the “+” sign, there are “-“signs in the window. They are the objects that are drawing software’s attention. Cachya always tries to lock on bright objects. As a result, bright objects in background may confuse cachya and cause unstable tracking.

- From the demo video you can see that Cachya can track the target very well even when its brightness is low. Actually, **Cachya prefers a dark background to a bright target object**. Please remember this when you adjust video parameters. The demo video should give you an intuitive sense of what a good video source looks like.



Demo Video Input

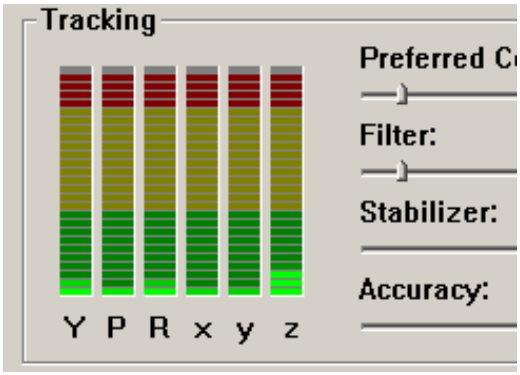
6.3.2. 3D demo

Note: 3D demo is a simple 3D application to demonstrate Cachya's features. To reduce CPU overhead, it turns off automatically when Cachya is not a top-level application. 3D demo requires specific video card support, and hence may not work without proper hardware.

- Check "3D Demo" check box on front panel to enable 3D demo; uncheck to disable it.
- The camera view of the 3D Demo follows the user's head movements. (If a video file is used as video input, camera follows the head in the video.) Camera can move in all 6 degrees of freedom (6DOF), namely Yaw, Pitch, Roll, X, Y and Z.
- 3D Demo takes posture data directly from track engine; game interface configuration has no effect over the 3D demo.

6.3.3. Meters & Gauges

- Activity meters:
  On the left of the front panel, there are 6 meters that can brighten to different levels. Those levels reflect activity on each of the 6DOF. Y, P, R, x, y and z refer to Yaw, Pitch, Roll, x, y and z translations, respectively.

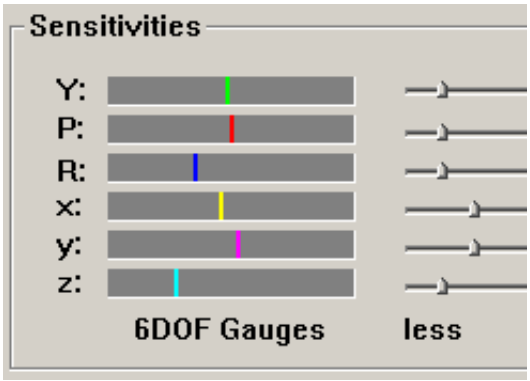


Activity Meters

When head is steady, meters should remain in the low section of its green zone, the lower the better. Readings outside of the green zone usually indicates a high noise level.

When the head moves, meters “jump” accordingly. For example, when the head moves from left to right, the x meter moves while other meters remain at low levels.

- 6DOF gauges:
  On the right of the front panel, there are 6 horizontal gauges. The positions of the color bars reflect position of each output.



6DOF Gauges

Center corresponds to zero output. Make sure all gauges are centered when your head is straight forward. You can use Hot Key “Ctl-`” to set the current head position as center.

6.3.4. Play with basic settings

Note: This section explains basic settings on front panel and how to use them. Please use the demo video as video input when you are adjusting the settings. **You can always return to the default setting by pressing the "Default" button at any time.**

- Preferred Contrast:

  Drag "Preferred Contrast" slider to its low end (leftmost). More and more "-" signs will show up. This means more objects are attracting the attention of the software. In the opposite direction, all "-" signs will disappear gradually; eventually, the "+" sign will become unstable and disappear as well. Pay attention to the meters, gauges and 3D demo to see how they become unstable and disappear.

  Setting the Preferred Contrast too high may cause the software to ignore the real target; too low a setting, on the other hand, may mislead the software into tracking irrelevant objects and increase the CPU overhead. The default setting is not necessarily optimal.

  Recommended Steps for setting Preferred Contrast:

  Step1: Sweep through the whole range to find the point where "+"sign start to disappear. If you do not see the "+"sign at all, check your video input. It might be too bright, too dark, out of focus or may have very low contrast. (Refer to section 3.6 for video configuration)

  Step2: Set "Preferred Contrast" to 1/3 – 2/3 as the point found in step1.

  In this case Cachya locks onto an object other than the real target; remove the false target from the camera's vision. You can tell which object is causing trouble by monitoring the "+"sign.

- Filter & Stabilizer:

  Video signals are usually noisy, as are the raw tracking outputs. Cachya utilizes a filter and a stabilizer to reduce tracking noise by averaging out fast shaking.

  As the noise goes down, delay goes up. In other words, at higher settings, tracking becomes smoother but more sluggish. While smoothness is desirable, sluggish response is not.

The filter and stabilizer both serve the same purpose, to reduce noise. But they are designed to deal with different types of noises. The default setting is optimized for average video quality.

Drag the filter slider on the front panel from left to right, observe its effect on activity meters, 6DOF gauges and the 6DOF demo video.

Filter and stabilizer can only help if tracking is stable. Losing tracking is not a result of the action of the filter or stabilizer.

- Accuracy:

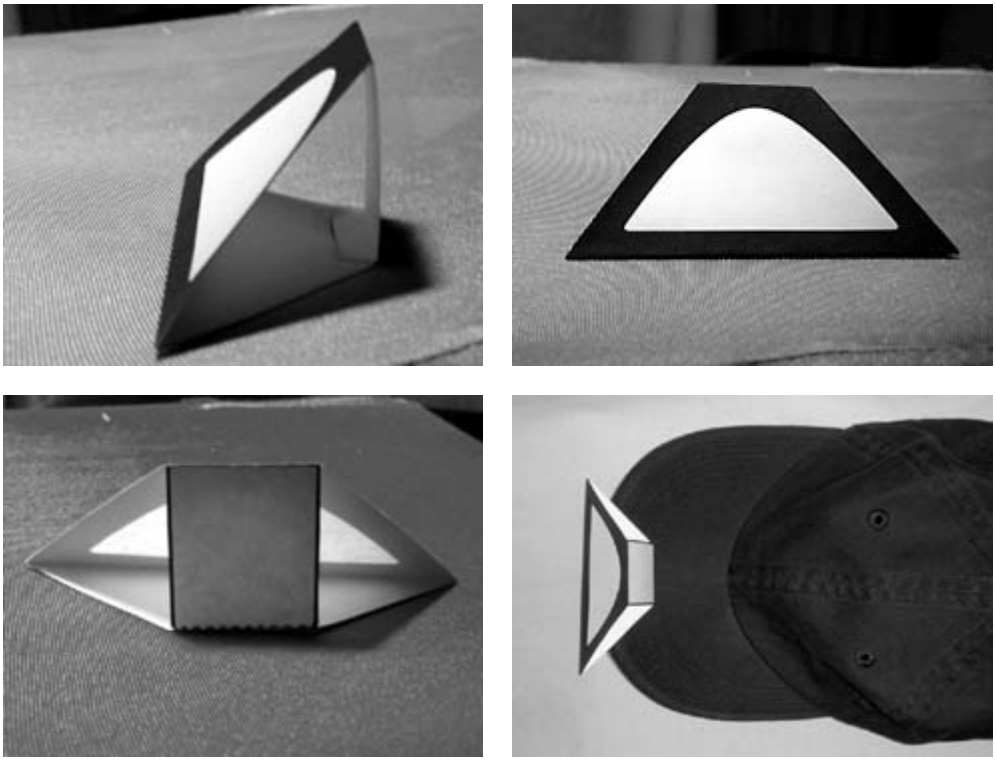
  When accuracy setting is at its high end (rightmost setting), Cachya attempts to follow the user's head very closely; every bit of target movement causes output to change. When output is used to control the mouse cursor, and you want to use the mouse to make fine adjustments, this continuous motion may be very annoying. A lower accuracy setting can provide better results. When the accuracy is low, Cachya adjusts its output only if the head has moved significantly.

  Accuracy is different from dead zone; Dead zone ignores movements around the center. Low accuracy ignores slight movements when head is relatively steady.

6.4. Make a good Head Sign

Note: Cachya uses a special shaped white card, Head Sign, as its tracking target. The Head Sign's size and reflectivity are its most important parameters. For a mid-resolution webcam (320*240), we recommend the regular size head sign. Its image can be downloaded from here. For a lower resolution webcam, we recommend the bigger size head sign, its image can be downloaded from here.

- Print out the downloaded image on non-reflective white paper.
- Trim the image along the border with a scissors or sharp knife, then fold and attach it, as shown in the pictures below:



- Next, mount it on your hat with double-sided tape (last picture above).
- Put the hat on, with the Head Sign side facing the camera.

6.5. Enable real-time video tracking

6.5.1. Video capture device

Note: Cachya works with video capture devices that support either VFW or DirectX. Most USB webcams support both of them. Please use DirectX driver whenever it is available.

- Make sure that a compatible video capture device is installed on your computer before launching Cachya.
- In a combo box right above the “Load Video” button, all available devices are listed.
- Identify and select the device you want to use as video source. Software will connect and initialize the device and display a living video in the preview window.
- If you have put on the head sign, software may recognize and lock on it right away. Don’t worry if it doesn’t, we usually need to make some adjustments on the video quality for the tracking algorithm to work properly.

6.5.2. Deal with video frame rate

Note: Video frame rate is displayed in the status bar. It is critical to have consistent frame rate per the requirement of tracking algorithm. Unfortunately, USB based webcams usually do not guarantee its frame rate, but keep changing it to ensure good exposure and color. This is called auto-exposure. Other factors like resolution and color format can also impact frame rate on your PC. If the frame rate number fluctuates or is very low (say, lower than 15), you can try to improve it by doing these:

- Disable auto-exposure and adjust exposure to its low end to increase frame rate. If the video is too dark, use a bigger lamp.
- Use lower resolution. Cachya is optimized to mid-resolution video stream, around 320 by 240 pixels. Higher resolution does not help performance but consumes a lot more CPU resource. Lower resolution is acceptable, but a bigger head sign is recommended.
- Use uncompressed video format if possible.
- Use USB 2.0 port.
- Use Black & White if available.
- Use I420 format instead of RGB.

6.5.3. Brightness, contrast, sharpness

Note: These three are the most common parameters that may affect tracking algorithm. You probably need to fine-tune them back and forth to find a good setting. Other parameters like gamma, smoothness and saturation may have impacts as well. Here are a few tricks:

- Brightness must be high enough to have the head sign VISIBLE, (Remember we prefer low exposure for higher frame rate, right?) and low enough to leave rest of the screen in dark (ideally, completely black). It is not necessary for the head sign to be very bright; clearly visible is good enough. Actually, Cachya prefers dark background rather than bright target.

- High contrast is preferred. You should combine contrast and brightness to make the head sign stand out from dark background.
- High sharpness may, sometimes, result in high video noise and color distortion. It is recommended to set sharpness to default, which is usually optimized for normal usages.
- Gamma has similar effect as contrast. Usually, you don't need to touch it but use contrast instead. In such a case that the background noise is too high, you can try to adjust Gamma to suppress the noise level.
- Smoothness is another term regarding the same nature as sharpness, but opposite. You can try either its default setting or higher settings.
- Please always set saturation to its lowest. Cachya does not use colors.

6.5.4. Preferred contrast

- Refer 3.4.5 for "Preferred Contrast" setting. You should be able to get relatively good tracking results if you have followed the steps above.

6.5.5. Video quality diagnostic

- Video quality diagnostic is a feature that we intend to have but not available at this moment. If you have questions or need help regarding video quality, please contact Cachya customer service.

6.6. Control mouse with your head

6.6.1. Enable mouse simulation

- Press "Game Control" button to bring up Game Control dialog box.
- Check "enable mouse simulation".
- Check "enable all" for full version, or "enable yaw" for trial version software.
- Press "Mouse Configuration" button to bring up Mouse Configuration dialog box.
- Map horizontal to "yaw", vertical to "pitch"
- Close Mouse Configuration dialog box.
- Close all opened dialog boxes.
- Try to control mouse cursor with your head.

6.6.2. Relative and absolute mode

- In absolute mode, your head gesture determines the absolute position of mouse cursor. In relative mode, mouse movement is related to its current position.

6.6.3. Basic hot keys

A few hotkeys are very useful, and can help you to enjoy the software.

- "Alt-`" is to switch on/off 6DOF output to Virtual Joystick, Mouse Simulation and FSX Controls. Try to press it a couple of times to see how it affects the mouse movement.
- "Ctl-`" is to set current head position as "Center". Please set mouse simulation to absolute mode to see the effect.
- "Alt-1, 2, 3, 4, 5, 6" are HotKeys to enable each degree of the 6DOF, namely "yaw", "pitch", "roll", "x", "y" and "z". "Alt-0" is to enable all of them, but is not available in trial version.
- Please try to switch between "yaw" and "pitch" with "Alt-1 and 2". Mouse cursor will move horizontally when yaw is enabled, vertically when pitch is enabled.
- If you are using full version software, press "Alt-0" to enable all 6 degrees. Now, you should be able to control mouse cursor with your head in both horizontal and vertical simultaneously.

6.6.4. Sensitivity, Filter and Stabilizer

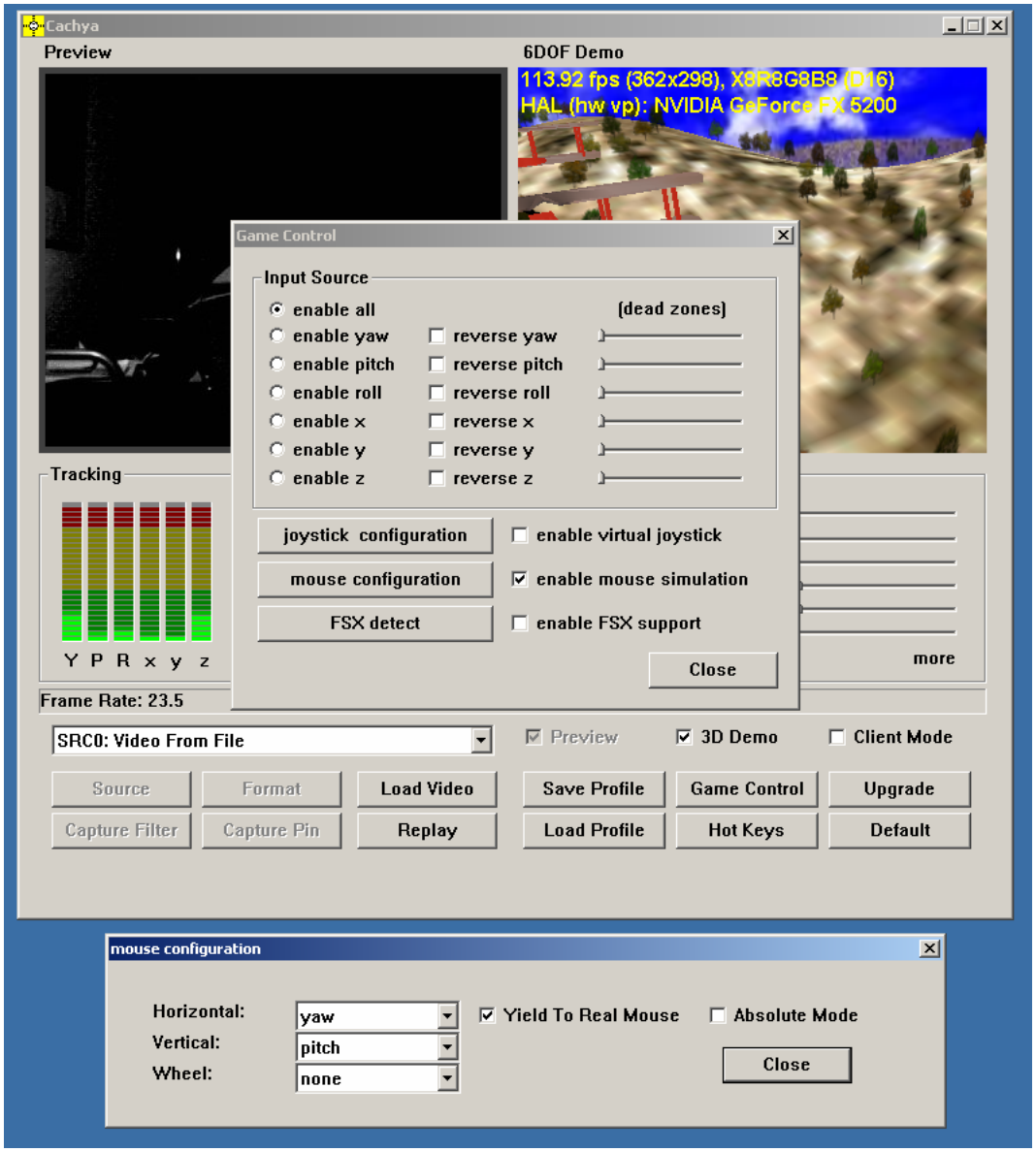
Note: There are 6 "sensitivity" slid bars on front panel to control sensitivity of each of the 6DOF outputs. Filter and Stabilizer are another two slid-bars that can be used to reduce jumpy tracking. They affect all 6DOF outputs.

- Try to adjust sensitivity slid-bars for "yaw" and "pitch", (the first two from the top) until you feel mouse cursor is both responsive and controllable.
- Try to adjust another slid-bar, Filter, to suppress tracking noise. The higher setting the smoother; and the lower the more responsive.
- Stabilizer works in the same way as it is in a digital camera to eliminate hand shaking. You can combine Stabilizer and Filter to achieve the best result. We recommend setting Stabilizer at its high end and Filter at low end.

7. Gaming configuration examples

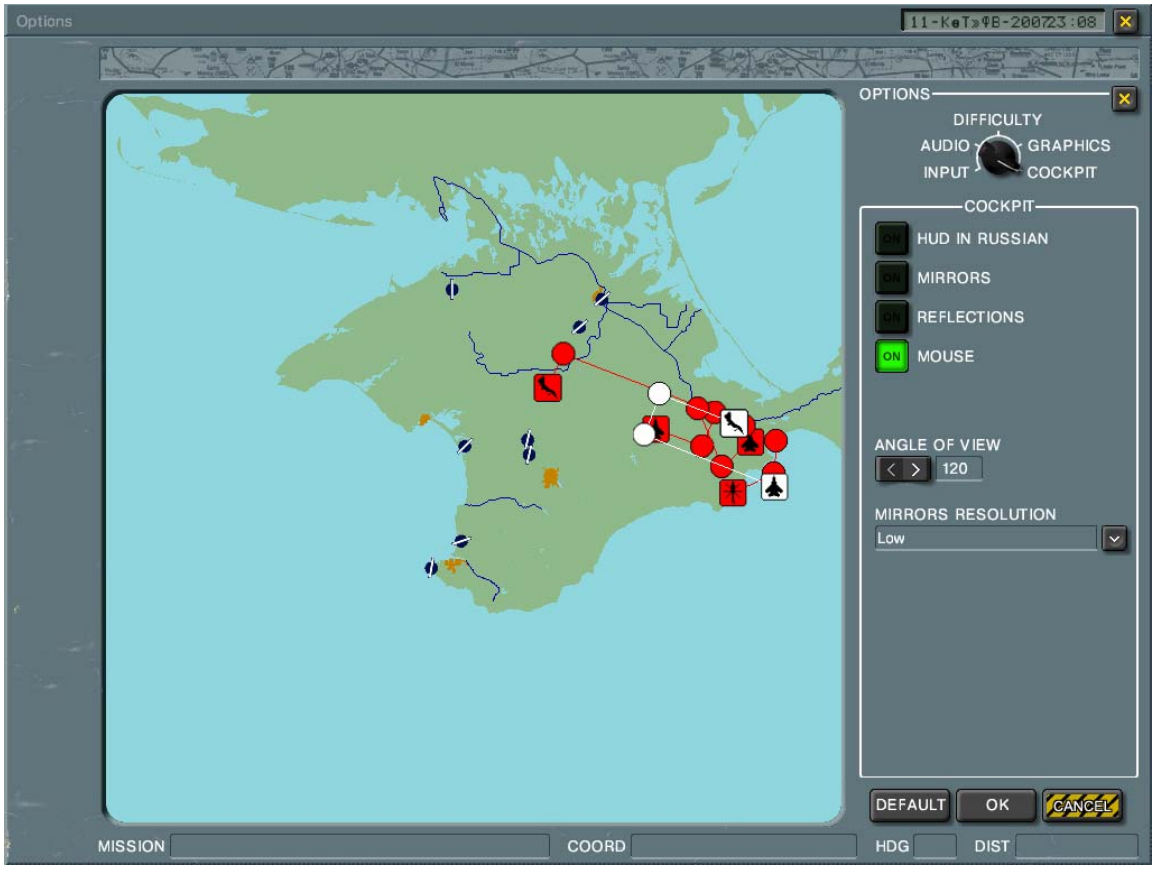
7.1. Enable mouse-look in “Pacific Fighters” and “Lock On”

- On Cachya front panel, click “Game Control” to bring up Game Control dialog box; check “enable mouse simulation”; click “mouse configuration” to bring up mouse configuration dialog box; map Horizontal to “yaw”, Vertical to “pitch”. This will enable mouse simulation. “Pacific Fighters” does not work with Absolute mode, so leave it unchecked. This configuration works with most games that support mouse- look. You may want to adjust “sensitivity” and “dead zones” to achieve best result.



Mouse Look Configuration

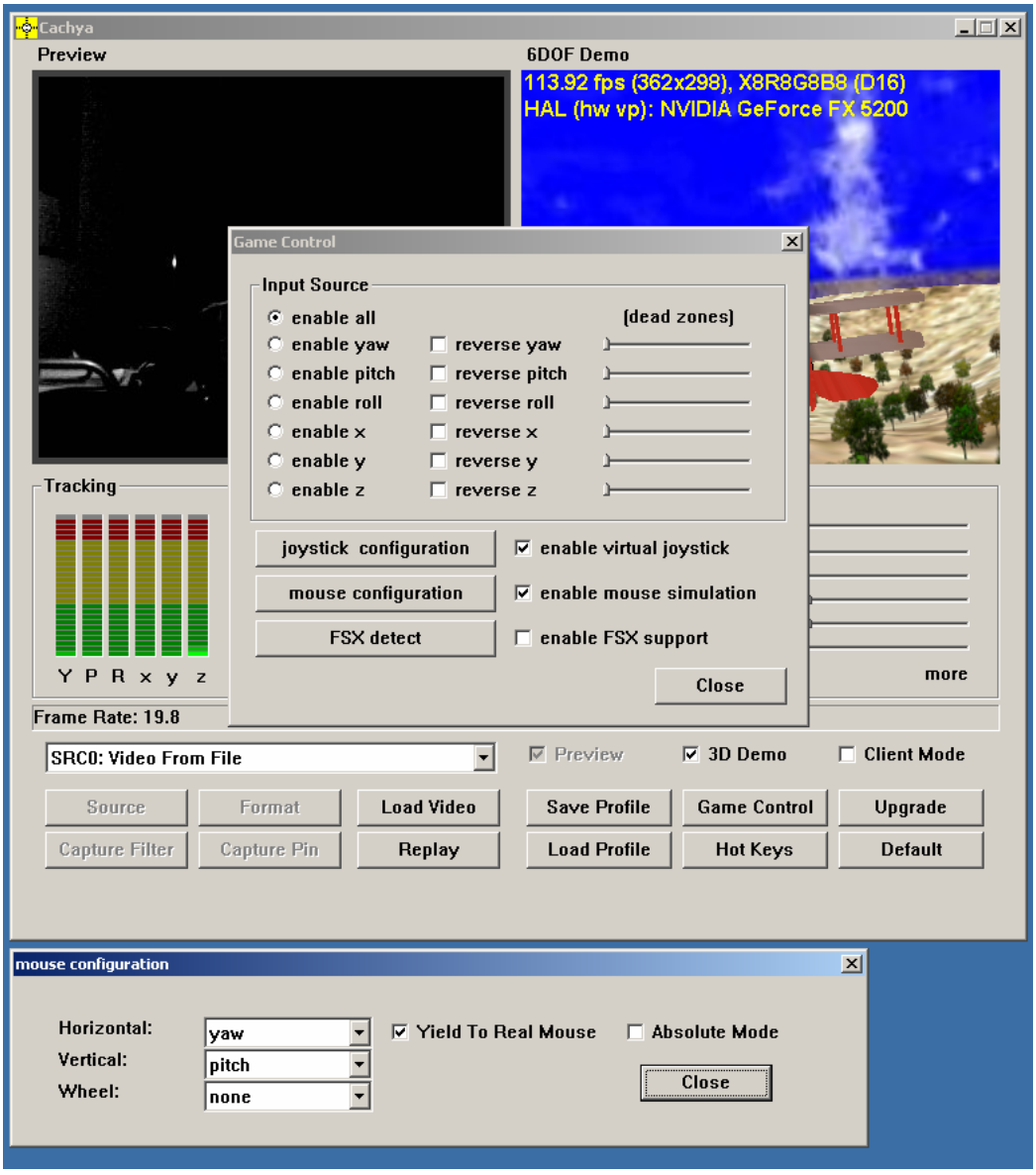
- “Pacific Fighters” enables mouse-look by default. But for “Lock On”, you must enable it. Go to Option panel; turn option switch to COCKPIT as shown below. Make sure the indicating light beside “MOUSE” is green on.



Enable mouse-look in Lock On

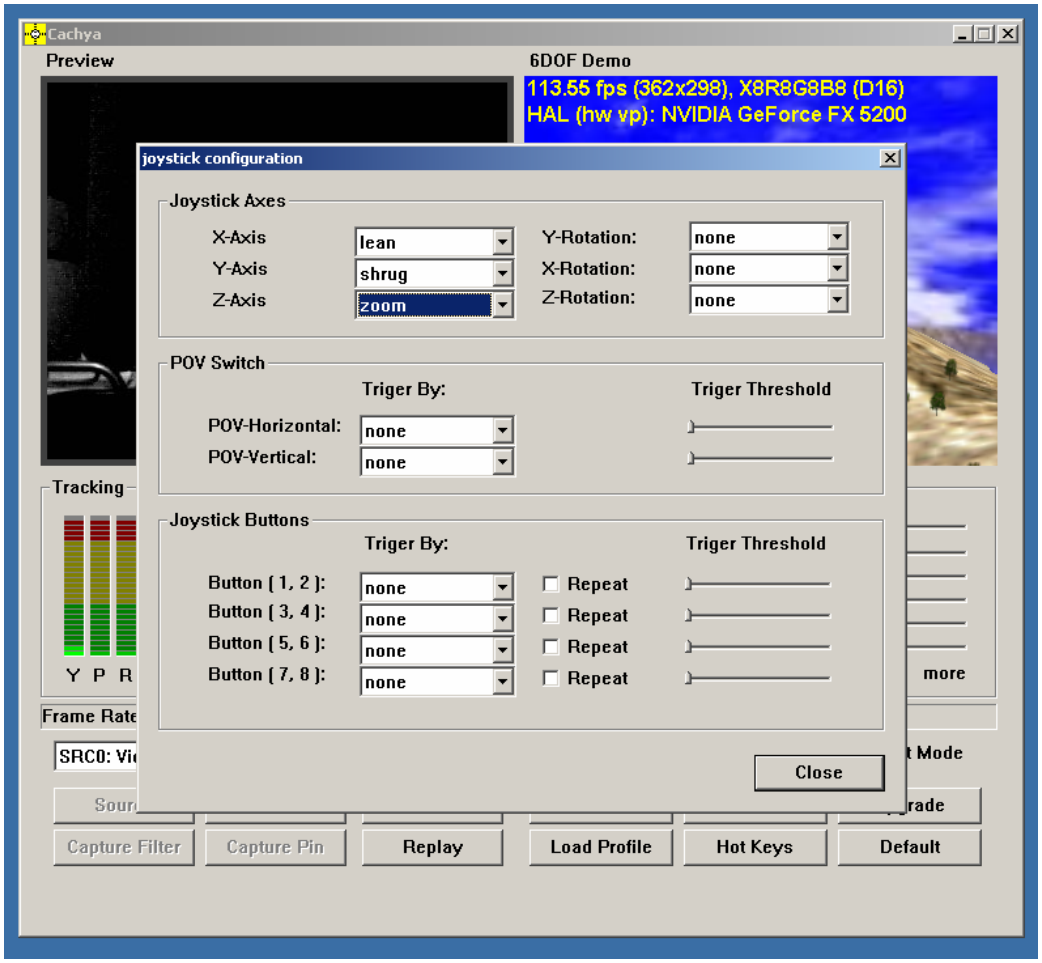
7.2. Enable 5DOF in Aces High II with mouse & joystick simulation

- Configure mouse simulation as you did in the first example; check “enable virtual joystick” as well;



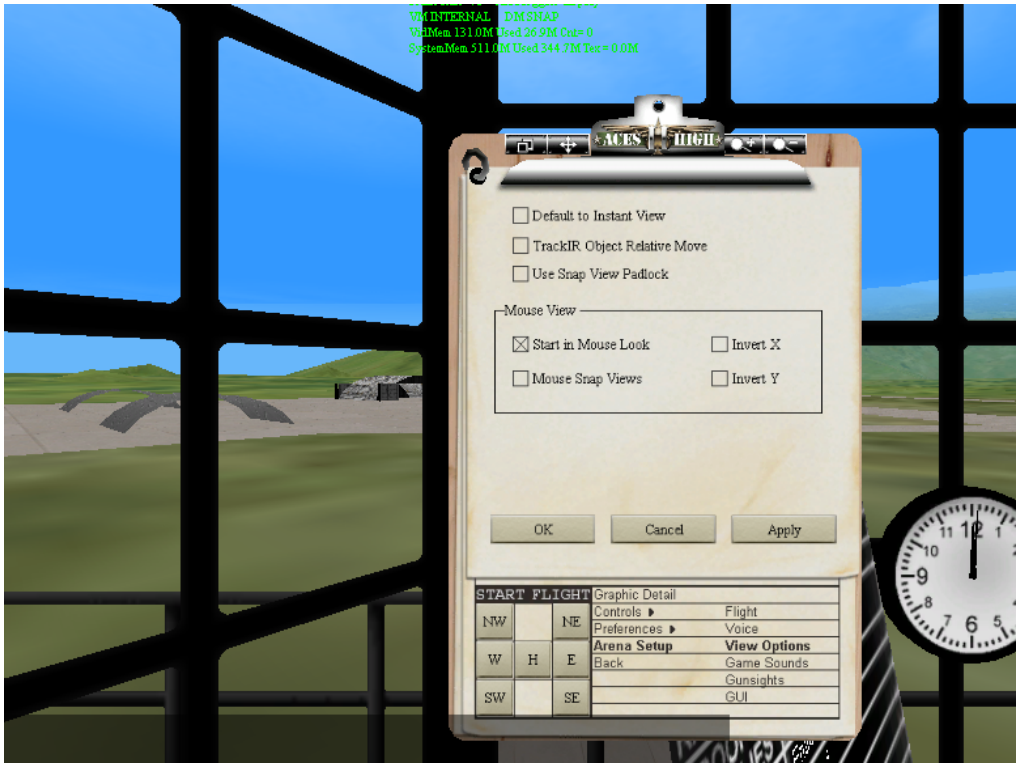
Aces High II mouse & joystick simulation enable

- Click “joystick configuration” to bring up joystick configuration dialog box; map X-Axis, Y-Axis & Z-Axis to “lean”, “shrug” & “zoom”.



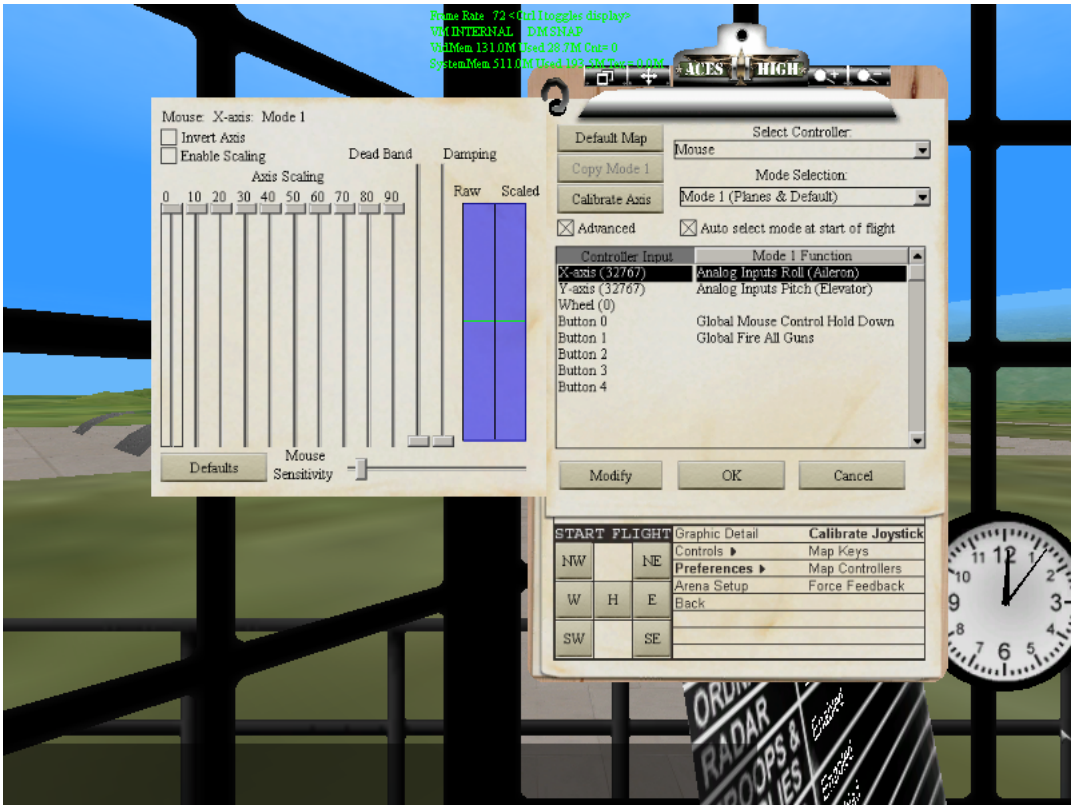
Aces High II Virtual Joystick Configuration

- In Aces High II, go to Preferences->View Options; check “Start in Mouse Look and leave other check boxes unchecked.



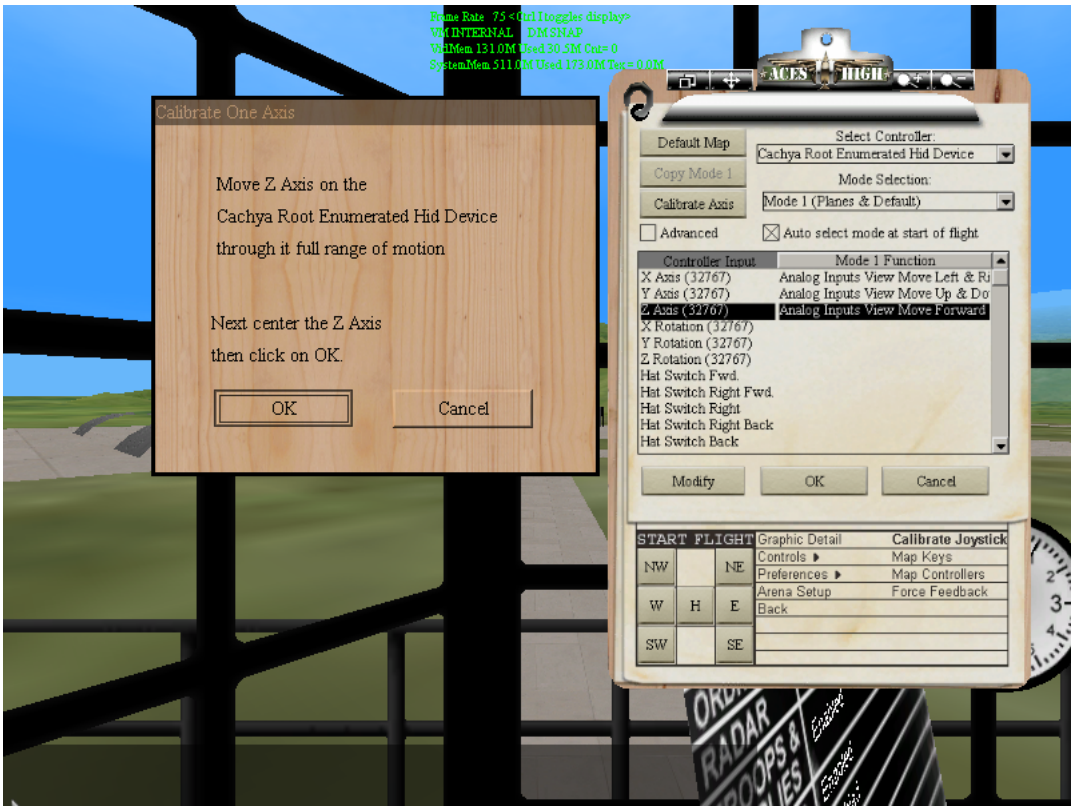
Aces High II Game Configuration

- In Aces High II, go to Controls->Map Controllers; select “Mouse” as current controller; highlight X-axis, drag sensitivity to lowest (its left most position); do the same thing for Y-axis. You will, later on, use Cachya front panel to adjust sensitivities.
- Click “Calibrate Axis” to calibrate mouse.



Aces High II Game Configuration

- In Aces High II, go to Controls->Map Controllers; select Cachya joystick as current controller; map X-axis, Y-axis and Z-axis to “View Move Left & Right”, “View Move Up & Down” and “View Move Forward & Backward” respectively.
- Calibrate each axis by using Cachya Hot Keys. (See Hot Key section of this document for description and Hot Key definitions).



Aces High II Game Configuration

- Start Flight and enjoy it.
- You can adjust sensitivity of each axis to achieve the best result.

7.3. Enable 6DOF in FSX

- To enable FSX support, click “Game Control”, check “enable FSX support” check box.

8. Using the software

8.1. Front Panel

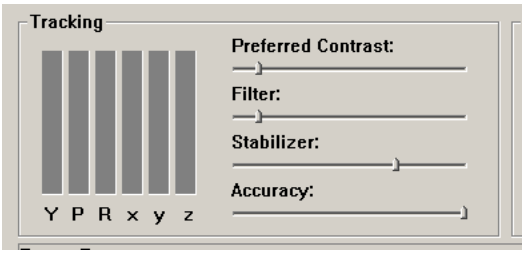
8.1.1. Preview window

This is the window where video play back. “+” sign and “-“ signs may be displayed in this window to indicate objects that are being tracked by software.

8.1.2. 6DOF Demo window

This is the window for a build in 3D demo application, with a view point being controlled by user’s head. This demo consumes quite a bit of CPU resource and will be automatically disabled when software is not the top application on desktop.

8.1.3. Tracking area



Tracking Area

- Activity meters
  These are 6 level meters that reflect activity levels of each moving degree; “Y, P, R, x, y and z” represent “Yaw, Pitch, Roll, horizontal translation, vertical translation and zooming” respectively. When user is holding his head steady, the activity levels should stay low; high activity level indicates high tracking noise.

- Preferred Contrast Slid Bar
  Use this slid-bar to adjust “Preferred Contrast”. Software looks for objects that have higher contrast than the preferred contrast setting. Setting this parameter too high may result in frequently losing track; too low, consumes extra CPU resource and may cause bad tracking performance as well.

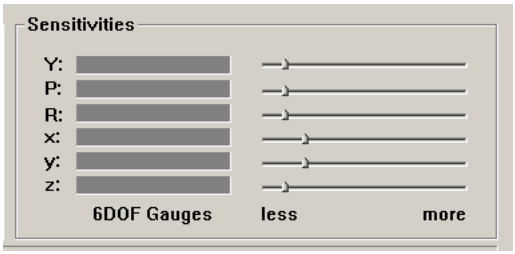
- Filter Slid Bar
  Use this slid-bar to control noise filter. Higher setting reduces more noise but gives sluggish response time.

- Stabilizer Slid Bar

Use this slid-bar to control software stabilizer, which is designed to remove shaking. None of the Stabilizer and Filter settings affect tracking rate, which is mainly determined by video quality and Preferred Contrast setting.

- Accuracy Slid Bar
  Use this slid-bar to control tracking algorithm accuracy. Always set it to its highest except in a few special cases.

8.1.4. Sensitivity area

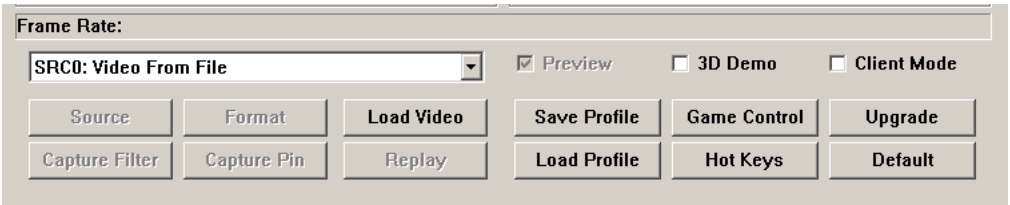


Sensitivity Area

- Output gauges
  These are 6 gauges that reflect 6DOF outputs; “Y, P, R, x, y and z” represent “Yaw, Pitch, Roll, horizontal translation, vertical translation and zooming” respectively. Hot Key “Ctl-`” centers them to the middle.

- Sensitivity Slid Bars
  There are 6 slid-bars to control output sensitivities. Higher setting means more sensitive. User can adjust select output with Hot Keys; “Alt-7” for more sensitive, “Alt-8” for less sensitive.

8.1.5. Others



Other Settings

- Status bar
  This is an area for software to display messages and report errors.

- Video source select
  Use this comb-box to select capture devices or video files as video input.

- Source button
  This button brings up Video Source configuration dialog box, which is provided by the vendor of video capture device. Most of VFW webcams use this interface to control video quality.

- Format button
  This button brings up Video Format configuration dialog box, which is provided by the vendor of video capture device. Most of VFW webcams use this interface to control video resolution and color format.

- Capture Pin button
  This button is similar to Source button, but for Stream Video device.

- Capture Filter button
  This button is similar to Source button, but for Stream Video device.

- Load Video button
  Load a previously captured video file from hard disk as the video source.

- Replay button
  Rewind and replay the loaded video file from its beginning.

- Preview checkbox
  Toggle the video preview on or off.

- 3D Demo checkbox
  Enable/Disable build in 3D demo application if compatible hardware exists.

- Client Mode checkbox
  Swap between Normal Mode and Client Mode, in which software takes tracking inputs from another Cachya program running on a remote computer in Normal Mode. A dialog box will be displayed for user to enter remote IP address.

- Save Profile button
  Save the current configuration to a profile.

- Load profile button
  Load configurations from a previously saved profile.

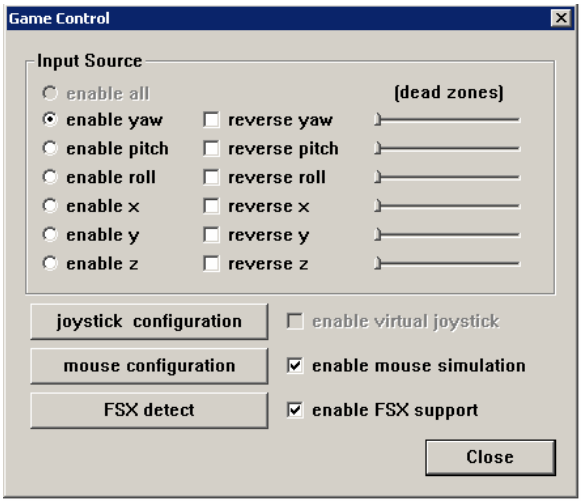
- Game Control button
  This button brings up Game Control dialog box.

- Hot Keys button
  This button brings up Hot Key definition dialog box.

- Upgrade button
  Upgrade software to the latest full version. Requires user email address, valid registration key and Internet connection.

- Default button
  Reset parameters to their default values. A dialog box will be displayed for user to choose what parameters to reset.

8.2. Game Control Dialog



Game Control Dialog

8.2.1. Input source area

- Use radio buttons, check boxes and slid bars to enable, reverse output direction or specify dead-zone for each of the 6 DOF.

- Enable all is not available in Trial version software. You can use Hot Keys to enable each output at a time.

- Setting dead-zone sliders to the left most, disables dead-zone.

8.2.2. Others

- Enable virtual joystick check box
  Check this box to enable joystick output. Otherwise, joystick outputs all 0s.

- Enable mouse simulation check box

Check this box to enable mouse simulation.

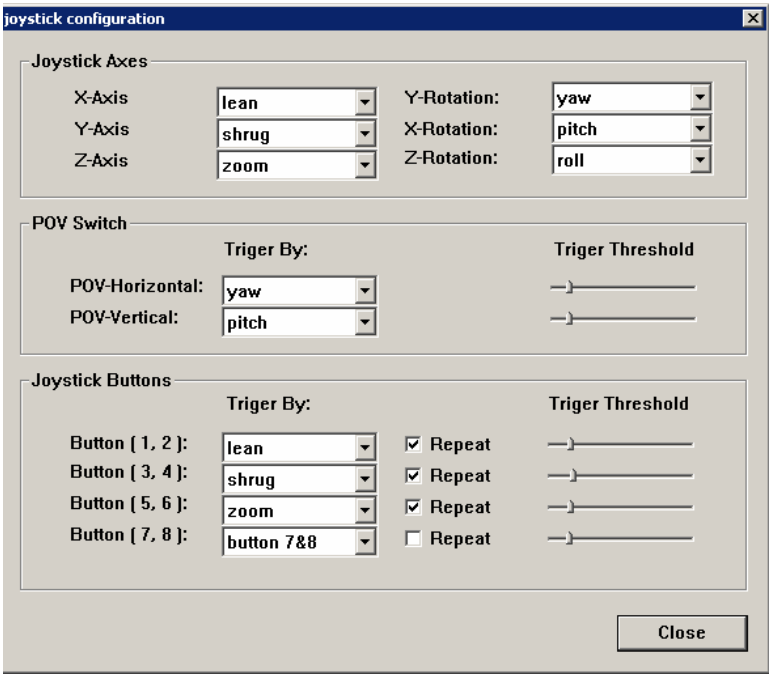
- Enable FSX support check box
  Check this box to enable FSX support. FSX support is not available on "Windows 2000".

- Joystick Configuration button
  This button brings up "Joystick Configuration" dialog box.

- Mouse Configuration button
  This button brings up "Mouse Configuration" dialog box.

- FSX Configuration button
  This button brings up "FSX Configuration" dialog box.

8.3. Joystick Configuration



Joystick Configuration Dialog

8.3.1. Joystick Axes area

- 6 combo-boxes in this area allow user to map each axes of the virtual joystick to a head positions or an axis of a physical joystick device. Only the first physical joystick device can be used as mapping input.

8.3.2. POV Switch area

- Allows user to control an 8-way POV switch of the virtual joystick with head positions (for instance, yaw and pitch).

- Trigger threshold determines the dead-zone area, in which POV switch is not triggered but stay in the middle.

8.3.3. Joystick Buttons area

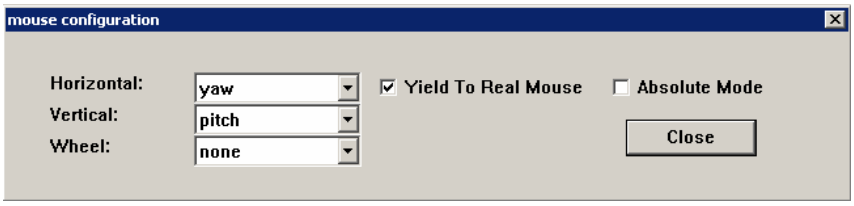
- Allows user to control 4 pairs of joystick buttons with head positions. Each pair reflects one analog axis.

- Trigger threshold determines the dead-zone area, in which both buttons are triggered.

- Repeat check box, when checked up, sets the button pair to repeating mode.

- Buttons can also be mapped to buttons of the first physical joystick device found on this PC.

8.4. Mouse Configuration



Mouse Configuration Dialog

- Horizontal comb-box
  Allows user to map mouse horizontal movements to one of the 6DOF outputs.

- Vertical comb-box
  Allows user to map mouse vertical movements to one of the 6DOF outputs.

- Wheel comb-box
  Allows user to map mouse wheel movements to one of the 6DOF outputs.

- Yield To Real Mouse check box
  When checked, mouse simulation stops if a real mouse is moving. Simulation resumes 1 second after the real mouse stops

- Absolute Mode check box
  When checked, use absolute positions instead of relative ones.

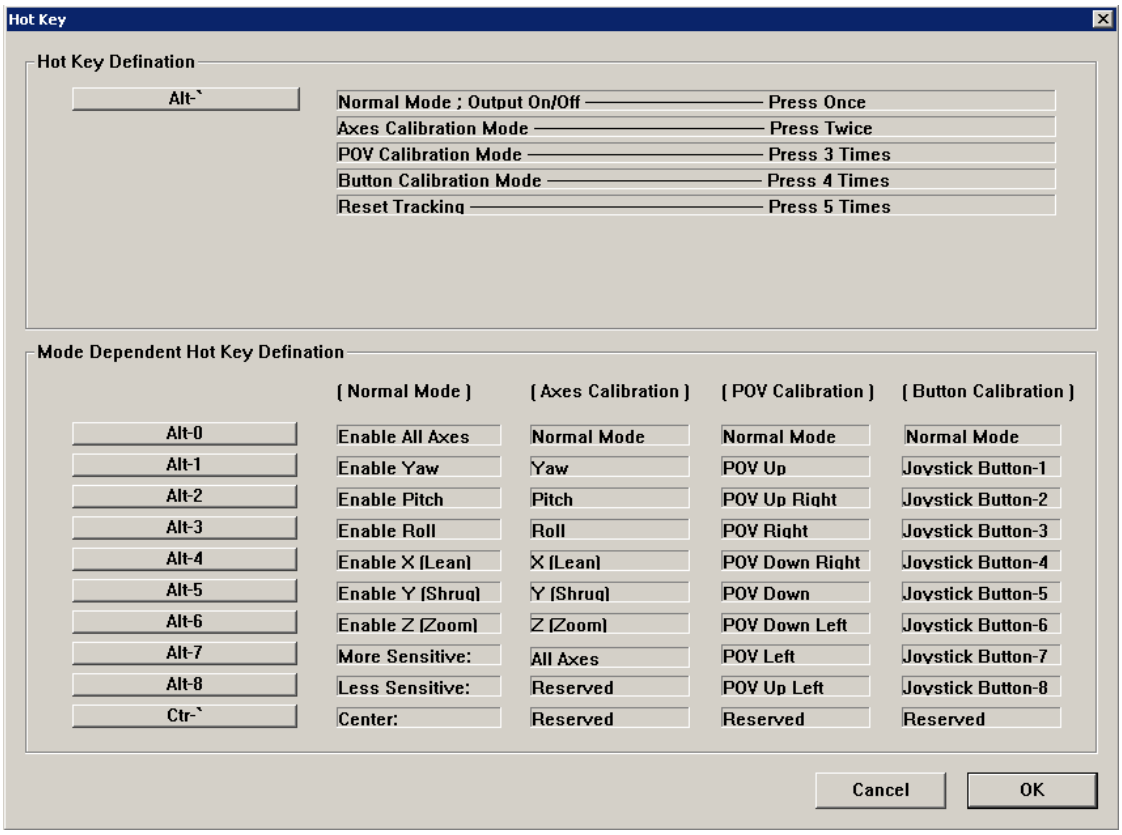
8.5. FSX Configuration

- Server IP
  Specifies the IP address of FSX server. (The computer on which FSX is running).

- Local Server check box
  Check this box if Cachya is running on the same computer as FSX does.

8.6. Hot Keys and output mode

Note: This section explains Hot Key usage. A Hot Keys is named by its definition or default. “Hot Keys” button on front panel brings up “Hot Key” dialog box, on which all current definitions are displayed.


Hot Key
Hot Key Defination
Alt-`
Normal Mode ; Output On/Off — Press Once
Axes Calibration Mode — Press Twice
POV Calibration Mode — Press 3 Times
Button Calibration Mode — Press 4 Times
Reset Tracking — Press 5 Times
Mode Dependent Hot Key Defination
(Normal Mode)
(Axes Calibration)
(POV Calibration)
(Button Calibration)
Alt-0 Enable All Axes Normal Mode Normal Mode Normal Mode
Alt-1 Enable Yaw Yaw POV Up Joystick Button-1
Alt-2 Enable Pitch Pitch POV Up Right Joystick Button-2
Alt-3 Enable Roll Roll POV Right Joystick Button-3
Alt-4 Enable X (Lean) X (Lean) POV Down Right Joystick Button-4
Alt-5 Enable Y (Shrug) Y (Shrug) POV Down Joystick Button-5
Alt-6 Enable Z (Zoom) Z (Zoom) POV Down Left Joystick Button-6
Alt-7 More Sensitive: All Axes POV Left Joystick Button-7
Alt-8 Less Sensitive: Reserved POV Up Left Joystick Button-8
Ctr-` Center: Reserved Reserved Reserved
Cancel
OK
Hot Key Definition Dialog

8.6.1. About Virtual Joystick

Cachya allows user to control Virtual Joystick with Hot Keys. In general, Virtual Joystick operates in 1 of 4 possible operation modes, normal mode, axes calibration mode, POV calibration mode and button calibration mode. Hot Keys are shared but interpreted differently in each mode. Operation modes have no effect on mouse and FSX output.

8.6.2. Switch among modes

- Press "Output On/Off" hot key (Default to "Alt-`") twice to get into Axes calibration mode. In this mode, axes' outputs vary in its full range then stops at the center.

- Press "Output On/Off" hot key (Default to "Alt-`") three times to get into POV Switch calibration mode. In this mode, POV Switch is controlled by keyboard. Switch buttons are turned off.

- Press "Output On/Off" hot key four times to get into switch button calibration mode. In this mode, switch buttons are controlled by keyboard. POV Switch is turned off.

- In any calibration mode, press "Output On/Off" hot key once to go back to normal operation mode and set head tracking output at "On" state. In normal mode, head movements control all axes and buttons.

- In normal operation mode, press "Output On/Off" hot key once, to toggle head tracking output between "On" and "Off" states.

8.6.3. Hot Keys in normal mode

- "Enable All Axes" (Default to "Alt-0")
  Enable outputs on all axes.
- "Enable Yaw" (Default to "Alt-1")
  Enable Yaw output
- "Enable Pitch" (Default to "Alt-2")
  Enable Pitch output
- "Enable Roll" (Default to "Alt-3")
  Enable Roll output
- "Enable X (Lean)" (Default to "Alt-4")
  Enable X-translation output
- "Enable Y (Shrug)" (Default to "Alt-5")
  Enable Y-translation output
- "Enable Z (Zoom)" (Default to "Alt-6")
  "Enable Z-translation output
- More sensitive" (Default to "Alt-7")
  Increase sensitivity of the enabled axes
- "Less sensitive" (Default to "Alt-8")
  Decrease sensitivity of the enabled axes
- "Center" (Default to "Alt-`")
  Set current head position as the center

8.6.4. Hot Keys in Axes Calibration Mode

Note: Calibrate an axis means the output of specified axis sweeps through its whole output range, then stops at its center.

- "Normal Mode" (Default to "Alt-0")
  Switch back to Normal Mode
- "Yaw" (Default to "Alt-1")
  Calibrate Yaw axis
- "Pitch" (Default to "Alt-2")
  Calibrate Pitch axis
- "Roll" (Default to "Alt-3")
  Calibrate Roll axis
- "X (Lean)" (Default to "Alt-4")
  Calibrate X-axis
- "Y (Shrug)" (Default to "Alt-5")
  Calibrate Y-axis
- "Z (Zoom)" (Default to "Alt-6")
  Calibrate Z-axis
- "All Axes" (Default to "Alt-7")
  Calibrate All 6 Axes

8.6.5. Hot Keys in POV Switch Calibration Mode

Note: These are a group of keys that allow you to press the virtual 8-way POV button on the Virtual Joystick Device accordingly.

- "Normal Mode" (Default to "Alt-0")
  Switch back to Normal Mode
- "POV Up" (Default to "Alt-1")
  Press POV Up
- "POV Up Right" (Default to "Alt-2")
  Press POV Up Right
- "POV Right" (Default to "Alt-3")
  Press POV Right
- "POV Down Right" (Default to "Alt-4")
  Press POV Down Right
- "POV Down" (Default to "Alt-5")
  Press POV Down
- "POV Down Left" (Default to "Alt-6")
  Press POV Down Left
- "POV Left" (Default to "Alt-7")
  Press POV Left
- "POV Up Left" (Default to "Alt-6")
  Press POV Up Left

8.6.6. Hot Keys in Button Calibration Mode

Note: These are a group of keys that allow you to press the virtual buttons on the Virtual Joystick Device accordingly.

- "Normal Mode" (Default to "Alt-0")
  Switch back to Normal Mode
- "Joystick Button-1" (Default to "Alt-1")
  Press Button-1
- "Joystick Button-2" (Default to "Alt-2")
  Press Button-2
- Joystick Button-3" (Default to "Alt-3")
  Press Button-3
- "Joystick Button-4" (Default to "Alt-4")
  Press Button-4
- Joystick Button-5" (Default to "Alt-5")
  Press Button-5
- "Joystick Button-6" (Default to "Alt-6")
  Press Button-6
- Joystick Button-7" (Default to "Alt-7")
  Press Button-7
- "Joystick Button-8" (Default to "Alt-8")
  Press Button-8

8.7. Software Upgrade

Full version software allows user to activate 6DOF. You need an Internet connection, updated Web browser and a credit card for purchasing license and upgrade software online.

For purchasing license, please go to our website.

If you are a registered user, press "Upgrade" button on software's front panel and enter user information as required. Software update may take a few minutes to complete. For any upgrade problem, click Here to contact Cachya Customer Service or send email to customerservice@cachya.com.

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